Center Innovation Fund

Integrated Display & Environmental Awareness System (IDEAS)

Completed Technology Project (2015 - 2017)

Project Introduction

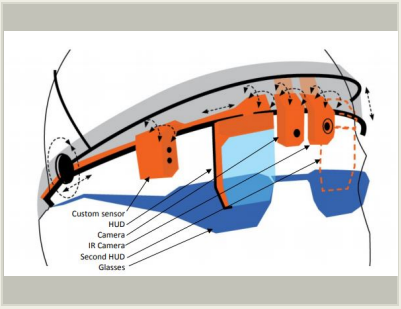
The goal of this project is the development of a head mounted display for use in operations here on Earth and in Space. The technology would provide various means of visual communication and augmented reality information to its user. With the goal of dramatically improving situational awareness thus improving the safety and efficiency of the worker.

Anticipated Benefits

All ground operations for NASA missions can benefit from this technology as it increases the safety of operators while also increasing their efficiency.

These benefits include:

- Enhancement of activity efficiency through precise (localized, timed, supervised) procedural guidance, recording and further possibility of system and human learning / optimization
- Enhancement of human safety thanks to higher process control, process clarity, activity monitoring, environmental monitoring and warnings directly "on eye"
- Enhancement of affordances of human activity thanks to availability of virtual tools and components supporting reality or virtual reality immersion
- Enhancement and provision of instant or real time information processing thanks to wearable or portable computers and sensors that can analyze, sense, perceive, interpret and model information according to user needs or environmental settings allowing for more precise or correct decision making



Final hardware architecture sketch based on exchangeable modules concept allowing prescription or PPE glasses (blue) and not limiting peripheral vision.

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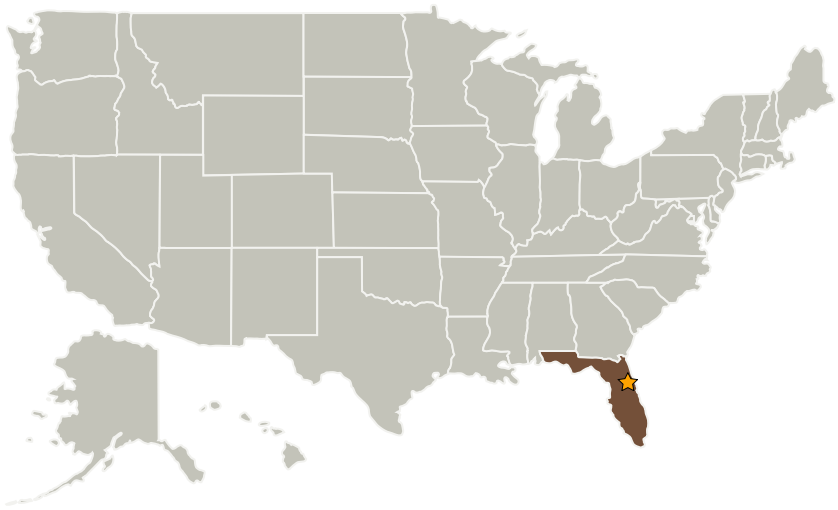
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Abacus Technology Corporation	Supporting Organization	Industry Small Disadvantaged Business (SDB)	
Florida Institute of Technology	Supporting Organization	Academia	Melbourne, Florida
Purple Rock Scissors	Supporting Organization	Industry	Orlando, Florida

Primary U.S. Work Locations
Florida

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Center Innovation Fund

Project Management

Program Director:

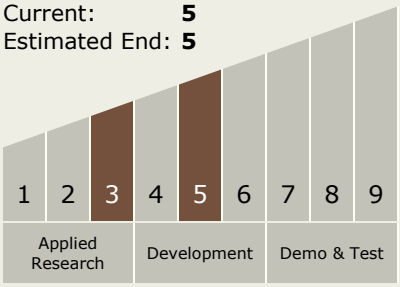
Michael R Lapointe

Project Manager:

David J Miranda

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

Continued on following page.

Integrated Display & Environmental Awareness System (IDEAS)

Completed Technology Project (2015 - 2017)

Project Transitions

January 2015: Project Start

April 2017: Closed out

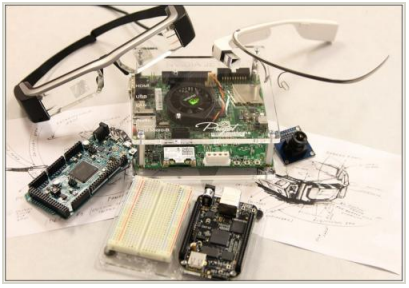
Closeout Summary: KSC early career team and partners successfully designed and built from the ground-up custom made:

- IDEAS Software
  - Five Applications
- Custom IDEAS Smart-Glasses
  - Hard-hat mounted modular system
- IDEAS Accessories
  - Multitude of devices that increase the capabilities of the user

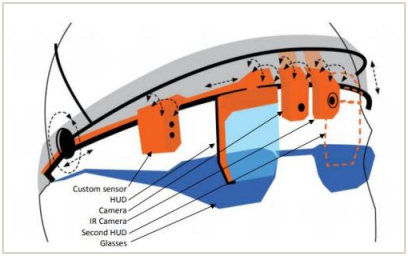
Achieved goal of developing a head mounted display technology that provides v arious means of visual communication and critical information to its user. This te chnology improves situational awareness thus increasing the safety and efficienc y of the worker.

Closeout Link: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170008821.pdf

Images



IDEAS Early Development
IDEAS early development environment, existing HMDs / smart glasses, development boards and sketches
(https://techport.nasa.gov/image/36922)



IDEAS Prototype Graphic
Final hardware architecture sketch based on exchangeable modules concept allowing prescription or PPE glasses (blue) and not limiting peripheral vision.
(https://techport.nasa.gov/image/36923)

Stories

KSC team delves into wearable tech in space
(https://techport.nasa.gov/file/51759)

Technology Areas *(cont.)*

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.2 Large Apertures

Target Destinations

Mars, Earth

Links

Integrated Display and Environmental Awareness System - System Architecture Definition (AIAA Space Forum 2017)
(https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170008821.pdf)

Early Career R&D Team Reaches Six Month Mark
(https://youtu.be/mjcepGVKtso)

IDEAS Pamphlet for the Consumer Electronics Show 2017
(https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170000326.pdf)

IDEAS To Enhance Operations on Earth and in Space
(https://www.nasa.gov/content/ideas-to-enhance-operations-on-earth-and-in-space)

KSC team delves into wearable tech in space (Florida Today)
(https://www.floridatoday.com/story/tech/science/space/2015/01/04/ksc-team-delves-wearable-tech-space/21262681/)

KSC team's 'IDEAS' could make space work safer (Florida Today)
(https://www.floridatoday.com/story/tech/science/space/2015/12/09/ksc-teams-ideas-could-make-space-work-safer/76994678/)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html